A KEY TO THE GENERA OF LAURACEAE IN THE NEW WORLD[1]

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ABSTRACT

A key to the twenty-nine genera of Lauraceae naturally occurring in the western hemisphere is presented. The key is based on floral and vegetative characters only. A brief statement on distribution and size of the genera is provided, together with a note on cupule shape. A Spanish translation of the key is included.

Lauraceae have, in general, the reputation of being difficult to identify. After having studied the neotropical members of this family for the last six years, I fully agree that the reputation is well deserved. There are various reasons for this. In the first place, many collections are sterile or fruiting and lack the floral characters needed for identification. To date, there are no keys for the generic identification of nonflowering specimens, and it is unlikely such a key will become available in the future. Sterile specimens may be recognized to species by a botanist familiar with the family, but if such instantaneous recognition does not occur, the specimen is likely to remain unidentified even to genus and therefore inaccessible for a long time. Fruiting specimens stand a better chance of being identified because the cupule (or its absence) contains useful information, especially when old stamens remain on the cupule. However, I am not able to construct a workable key based on fruit and vegetative characters. From a taxonomic point of view, fruiting specimens are valuable, even though difficult to identify, whereas sterile specimens are of little or no use. For botanists making forest inventories or studying species diversity, sterile voucher specimens are useful, hence collected, and end up on the desk of a specialist, where they often remain unidentified.

Even with good flowering material at hand, identification to genus is often difficult. In my opinion, the main reason for this problem is that no workable keys exist. The published keys are partly obsolete (such as Mez, 1889), are of regional scope (MacBride, 1938; Kostermans, 1936; Allen, 1945), use both floral and fruit characters (Kostermans, 1957; Hutchinson, 1964), or share a combination of these problems. Keys that are based on floral and fruit characters create special problems. As a rule, both floral and fruit characters are necessary for generic identification, but a single specimen rarely has both flowers and fruits. Typically, fruits need several months for development, by which time the flowers have long fallen off. Rarely, fruits from an earlier flowering season persist long enough to be collected with fresh flowers, but that is an exception. In such cases, flowers and fruits do not occur on the same inflorescence. Occasionally, one finds flowers and "fruits" on the same inflorescence. In my experience, such "fruits" are usually diseased and deformed. Thus, because flowering specimens almost never have fruits, a key that requires both flowers and fruits is not workable and will frustrate its user. However, it is possible to construct a generic key for neotropical Lauraceae based solely on floral and vegetative characters. I present such a key below, which includes all American genera.

The most important floral characters used in this key, as well as in earlier keys, are number of stamens, number of anther cells per stamen, sexual condition of the flowers, and tepals equal or unequal. These characters, although readily visible, are often variable within a genus, and this variation has rarely been incorporated in earlier keys. For example, *Persea* is usually presented as having nine 4-celled stamens, whereas the neotropical species can have nine or six stamens, these being all 4-celled, all 2-celled, or some 4- and some 2-celled. Moreover, the tepals can be equal or unequal and

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deciduous or persistent in fruit. In order to accommodate these permutations of characters, it is at times necessary to have a genus appear several times in the key.

While constructing this key, I have completely ignored any phylogenetic relationships among the genera, mainly because phylogenetic schemes of Lauraceae are partially based on fruit characters (Kostermans, 1957) or are based on wood and bark anatomy (Richter, 1981). These supposedly phylogenetic classifications (which are quite different from each other) cannot readily be followed in the construction of a key based on floral characters. Instead, my aim is to provide a workable key for the identification of flowering Lauraceae.

Before presenting the key, I will briefly describe the flower structure of Lauraceae. Examples are based on American genera, and unusual conditions of palaeotropical genera (such as dimerous flowers in *Potameia*) are not discussed. Typically, each flower has two whorls of three tepals each. The whorls are usually equal in size and shape, but there are exceptions. Tepals are unequal in all species of *Caryodaphnopsis*, in many species of *Persea* (Fig. 1c), in *Anaueria*, and in a few species of *Aniba* and *Licaria*. When tepals are unequal, the outer three are smaller, except in *Licaria*, where the outer three tepals can be larger (Fig. 1d). "*Chlorocardium*" is unusual in having the tepals in whorls of four or irregular. The stamens are arranged in four whorls of three each (with the exception of "*Chlorocardium*," which has stamens in whorls of four) and are opposite the tepals. The whorls are counted from the outside to the center of the flower. Whorl I is opposite the outer tepals, whorl II is facing the inner tepals, whorl III is opposite whorl I, and whorl IV opposite whorl II. With the exception of *Litsea* and "*Chlorocardium*," whorl IV is always staminodial or lacking. The stamens of whorl III nearly always have two globose glands at their base, the exceptions being *Mezilaurus* and *Williamodendron*, in which these glands are absent. In *Phyllostemonodaphne* and *Urbanodendron* all stamens have glands at their base. In *Pleurothyrium* the glands are strongly enlarged and may become fused, completely surrounding all stamens. In general, the stamens of whorls I and II are (nearly) identical and seemingly form one whorl of six stamens. The exceptions are *Dicypellium* and *Phyllostemonodaphne*, where the stamens of whorl I have become tepaloid and sterile, with only whorl II and III fertile. Stamens of whorl III differ occasionally from those of whorls I and II in number of anther cells. If different, whorl III has usually fewer anther cells (whorls I and II 4-celled, III 2-celled or sterile; whorls I and II 2-celled, whorl III sterile), but *Endlicheria anomala* has whorls I and II 2-celled and whorl III 4-celled. A further variation is that any of whorls I, II, and III can be sterile. (In some species only whorl I is fertile, or only I and II are fertile, or II and III are fertile, or only III is fertile; I have not yet seen a species with only whorl II fertile.) Table 1 presents the various androecial combinations and their distributions among neotropical Lauraceae, "*Gamanthera*" excluded. If a key were to include all known combinations of number of stamens, their position and number of anther cells in each whorl, one would end up with a very long and tedious (but workable) key. However, I found that a shorter and more practical key can be made by excluding the condition of the stamens of whorl III, as has first been done by Mez (1889). Exceptional species or groups of species, such as the 2-celled species of *Persea* and *Caryodaphnopsis* and the *Aiouea* species with three stamens are keyed out separately.

Following the key, the distribution, approximate number of species and fruit type are briefly described. When an unusual leaf position occurs in a genus, this is also mentioned.

A good magnifying glass, or preferably a dissecting microscope, is a necessity for identifying Lauraceae.

Included in the key are several taxa which are not yet published ("*Chlorocardium*," "*Gamanthera*," and "*Paraia*"). Their inclusion in the key is absolutely not intended as their publication, but is done to prevent the key from being obsolete at the moment of publication.

Key to New World Genera of Lauraceae

1	Parasitic leafless vine	*Cassytha*
1	Shrubs or trees with green leaves	2
2(1)	"Stamen" 1, by complete fusion of 3 stamens	"*Gamanthera*"
2	Stamens more than 1	3
3(2)	Flowers bisexual or staminate	4
3	Flowers pistillate	42
4(3)	Stamens 3	5
4	Stamens more than 3	8
5(4)	Stamens with 4 anther cells	*Williamodendron*
5	Stamens with 2 anther cells	6
6(5)	Leaves clustered near tips of branches; anther cells extrorse; inflorescence a panicle, ultimate divisions racemose	*Mezilaurus*
6	Leaves not clustered, but alternate or opposite; position of anther cells variable (in *L. cannella* leaves somewhat clustered, but anther cells introrse); inflorescence paniculiform, ultimate division cymose	7
7(6)	Only stamens of Whorl I fertile, the cells	

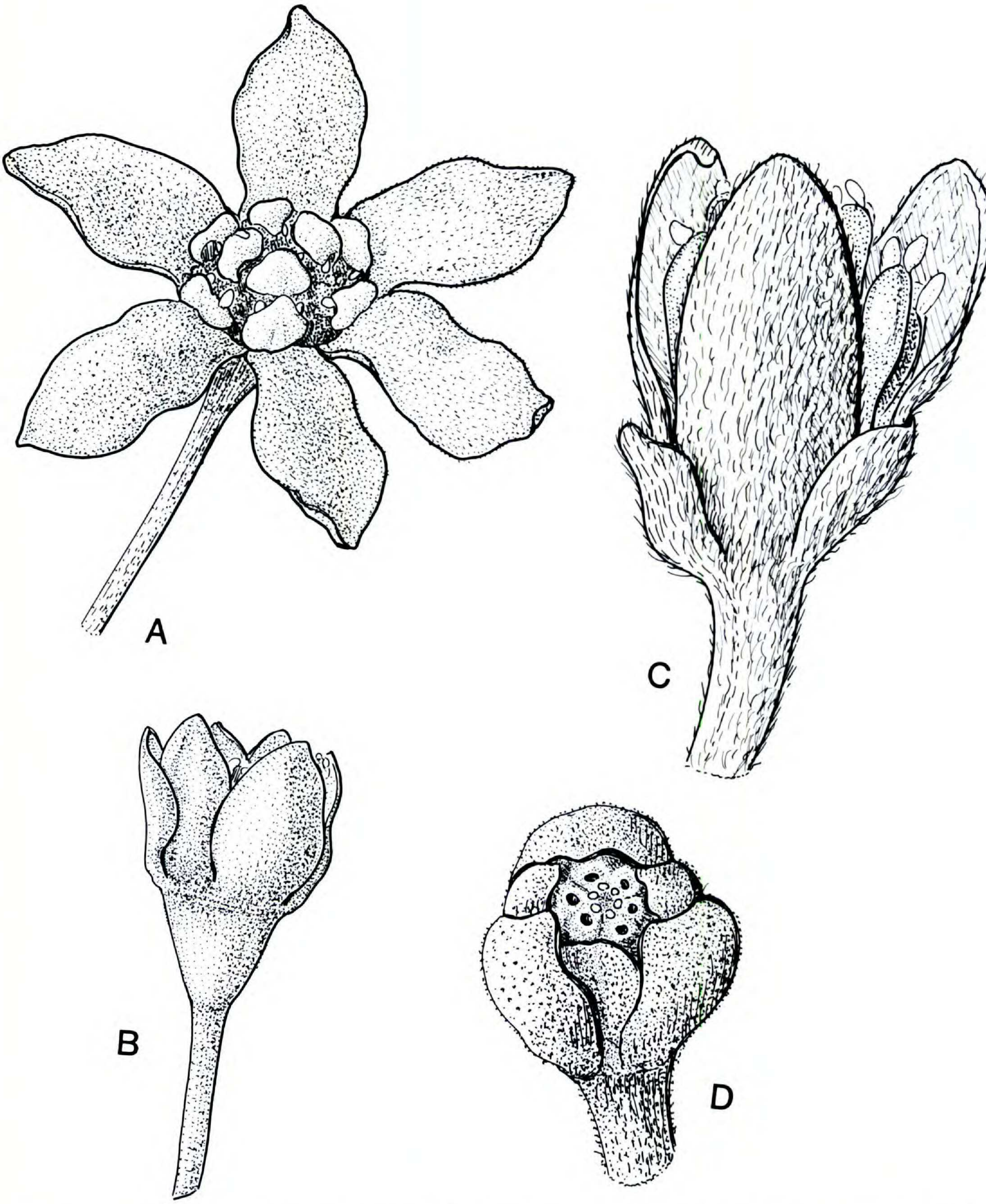

FIGURE 1. Flowers of: —A. *Nectandra grandiflora* Nees (*Gentry et al. 59163*);—B. *Ocotea atirrensis* Mez & Donn. Smith (*Grayum 6888*);—C. *Persea liebmannii* Mez (*Ishiki 1614*);—D. *Licaria bracteata* van der Werff (*Kunkel 56*).

lateral and large, or lateral basal and small; inflorescences and flowers glabrous .... *Aiouea*

7 Only stamens of Whorl III fertile, the cells extrorse, introrse or ± apical, not lateral; inflorescences and/or flowers usually with varying amounts of pubescence .... *Licaria*

8(4) Outer 6 stamens each with 2 anther cells 9

8 Outer 6 stamens each with 4 anther cells 23

9(8) Flowers unisexual 10

9 Flowers bisexual 11

10(9) Leaves deciduous in winter; flowers appearing before leaves .... *Lindera*

10 Plants evergreen, flowers and leaves present at the same time .... *Endlicheria*

11(9) Leaves opposite 12

11 Leaves alternate or clustered 15

TABLE 1. Androecial configurations of American Lauraceae.

Whorls I, II, & III 4-celled: *Caryodaphnopsis* pro parte, *Chlorocardium*, *Cinnamomum* pro parte, *Litsea*, *Nectandra*, *Ocotea*, *Paraia*, *Persea* pro parte, *Pleurothyrium*, *Povedodaphne*, *Rhodostemonodaphne*, *Sassafras*, *Umbellularia*, *Urbanodendron* pro parte

Whorls I, II, & III 2-celled: *Aiouea* pro parte, *Aniba* pro parte, *Beilschmiedia*, *Caryodaphnopsis* pro parte, *Cassytha*, *Cryptocarya*, *Endlicheria* pro parte, *Kubitzkia* pro parte, *Lindera*, *Persea* pro parte, *Urbanodendron* pro parte

Whorls I & II 4-celled, III 2-celled: *Cinnamomum* pro parte, *Kubitzkia* pro parte, *Persea* pro parte

Whorls I & II 4-celled, III 0-celled: *Persea* pro parte

Whorls I & II 2-celled, III 4-celled; *Endlicheria anomala*

Whorls I & II 2-celled, III 0-celled: *Aiouea* pro parte, *Anaueria*, *Aniba* pro parte, *Caryodaphnopsis* pro parte

Whorl I 2-celled, II & III 0-celled: *Aiouea* pro parte

Whorl I 0-celled, II & III 4-celled; *Dicypellium*

Whorl I 0-celled, II & III 2-celled: *Phyllostemonodaphne*

Whorl I & II 0-celled, III 4-celled: *Williamodendron*

Whorl I & II 0-celled, III 2-celled: *Licaria*, *Mezilaurus*

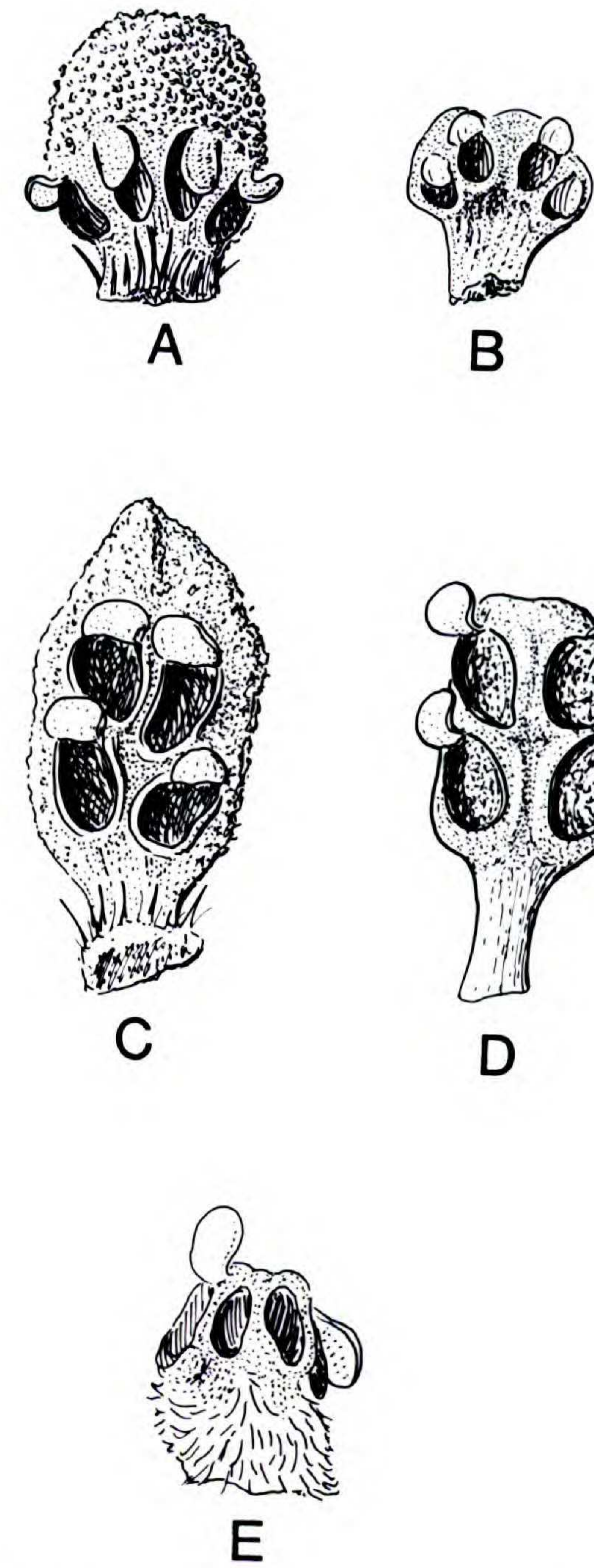

FIGURE 2. Stamens (whorl I or II) of:—A. *Nectandra reticulata* (R. & P.) Mez (*Kayap 161*);—B. *Nectandra membranacea* (Sw.) Griseb. (*Cuadros 2839*);—C. *Ocotea veraguensis* (Meissner) Mez (*Stevens 6476*);—D. *Ocotea pulchella* Mart. (*Goetzke 210*);—E. *Rhodostemonodaphne kunthiana* (Nees) Rohwer (*Perry s.n.*).

12(11) Stamens 6, triangular, dark red, the filaments wider than the anthers, united at the base; outer tepals about ½ as long as the inner ones .... *Anaueria*

12 Stamens 6 or 9, filaments free, narrower than the anthers; stamens never dark red; tepals equal or strongly unequal, outer ones ≤¼ the size of inner ones 13

13(12) Outer tepals ≤¼ the size of inner tepals .... *Caryodaphnopsis*

13 Tepals equal 14

14(13) Floral tube deep, about as long as the tepals .... *Cryptocarya*

14 Floral tube shallow, much shorter than the tepals .... *Beilschmiedia*

15(11) Filaments of stamens of Whorl III united; flowers red .... *Kubitzkia*

15 Filaments free; flower color variable, including red in some species 16

16(15) Stamens of Whorl I sterile, tepaloid; fertile stamens 6, representing Whorls II and III .... *Phyllostemonodaphne*

16 Stamens of Whorl I fertile; fertile stamens 9 or 6; if 6, representing Whorl I and II 17

17(16) Fertile stamens 9, each with 2 glands at the base .... *Urbanodendron*

17 Fertile stamens 6 or 9, only those of Whorl III with glands at their base 18

18(17) Outer tepals ca. ½ as long as inner ones (Fig. 1c) 19

18 Tepals equal or nearly so (Fig. 1a and b) 20

19(18) Staminodia (whorl IV) well developed, with sagittate or cordate apices; floral tube very short, much shorter than tepals; Andean species, 1,000–2,500 m elev. .... *Persea*

19 Staminodia (whorl IV) lacking; floral tube well developed; lowland Amazonian species .... *Aniba canelilla* or *A. parviflora*

20(18) Floral tube very shallow, scarcely visible at anthesis .... *Beilschmiedia*

20 Floral tube well developed, about as long as the tepals 21

21(20) Leaves with a fine, raised reticulation; floral tube deep and narrow, the tepals ± spreading and flowers clearly wider than floral tube; filaments much narrower than anthers; staminodia well developed .... *Cryptocarya*

21 Leaves with lax reticulation or this not ap-

parent; floral tube shallow or deep; if deep, tepals erect and flowers about as wide as floral tube; filaments frequently poorly differentiated from anthers; staminodia present or absent 22

22(21) Flowers (minutely) tomentellous, tomentose or with appressed pubescence, but never pruinose; filaments of stamens usually densely pubescent, poorly differentiated from anthers; leaves alternate or clustered .... *Aniba*

22 Flowers usually glabrous, infrequently with scattered hairs, sometimes pruinose; filaments of stamens usually glabrous and differentiated from anthers; leaves alternate .... *Aiouea*

23(8) Flowers unisexual 24

23 Flowers bisexual 27

24(23) Young inflorescences enclosed in decussate bracts; flowers arranged in pseudo-umbels .... *Litsea*

24 Young inflorescences not enclosed in decussate bracts; flowers arranged in panicles or racemes 25

25(24) Deciduous trees; flowers appearing before or with young leaves, leaves often lobed .... *Sassafras*

25 Evergreen plants with mature leaves when flowering; leaves never lobed 26

26(25) Anther cells arranged in a low arch (Fig. 2e); anthers poorly differentiated from filaments .... *Rhodostemonodaphne*

26 Anther cells arranged in 2 rows (Fig. 2c and d); anthers clearly differentiated from the much narrower filament (rarely filaments very short) .... *Ocotea*

27(23) Flowers arranged in pseudo-umbel, this, when young, covered by bracts .... *Umbellularia*

27 Flowers arranged in paniculiform inflorescences, these never enclosed by bracts 28

28(27) Leaves opposite 29

28 Leaves alternate or whorled 31

29(28) Outer tepals ≤ ¼ the size of the inner ones; leaves often strongly triveined .... *Caryodaphnopsis*

29 Tepals equal; leaves pinnately veined 30

30(29) Stamens 12 or more; leaves glabrous or nearly so on lower surface .... "*Chlorocardium*"

30 Stamens 9; leaves ferruginous tomentose or tomentellous on lower surface .... *Nectandra oppositifolia*

31(28) Anther cells on the flat tip of columnar stamens .... *Povedadaphne*

31 Anther cells not apical; stamens not columnar 32

32(31) All stamens with 2 glands at their base, the glands free .... *Urbanodendron*

32 Only stamens of Whorl III with glands (in *Pleurothyrium* glands greatly enlarged and sometimes fused) 33

33(32) Stamens of Whorl III with fused filaments; flowers red .... *Kubitzkia*

33 Stamens of Whorl III with free filaments; if filaments seemingly fused (in some *Ocotea* species), then flowers white to yellow, never red 34

34(33) Stamens of Whorl I devoid of anther cells, tepaloid .... *Dicypellium*

34 Stamens of Whorl I fertile, not tepaloid 35

35(34) Outer tepals about ½ the size of the inner ones 36

35 Tepals equal or nearly so 37

36(35) Stamens of Whorls I and II with a sterile, triangular tip; leaf apex rounded or obtuse; leaves whorled; Guyanas and adjacent Brazil and Venezuela .... *Ocotea rubra*

36 Stamens of Whorls I and II without a sterile, triangular tip, the anther cells occupying the entire anther; leaf apex various; leaves alternate or whorled; widespread, from SE U.S.A. to Brazil and Chile .... *Persea*

37(35) Staminal glands greatly enlarged, protruding between the outer 6 stamens and sometimes fused into a large, pillowlike mass; stamens of Whorls I and II with at least 2 lateral anther cells .... *Pleurothyrium*

37 Staminal glands not enlarged, not protruding between outer stamens; free; outer stamens with introrse cells 38

38(37) Staminodia representing Whorl IV well developed, with a cordate or sagittate apex; filaments of stamens as long as anthers or longer 39

38 Staminodia representing Whorl IV small or lacking; if present, mostly without a cordate or sagittate tip; filaments of stamens shorter than or as long as anthers (a few species of *Ocotea* have large staminodia with a cordate tip, but these have stamens with a very short filament) 40

39(38) Leaves usually tripliveined, alternate, frequently tufts of hairs present in the axils of the lowermost veins .... *Cinnamomum*

39 Leaves pinnately veined, alternate or clustered; axillary tufts of hairs lacking .... *Persea*

40(38) Leaves clustered; twigs with clusters of scars from fallen bracts; tepals roundish, hyaline, with a pubescent base, otherwise glabrous .... "*Paraia*"

40 Leaves alternate; twigs without clusters of scars from fallen bracts; tepals not roundish, not hyaline, glabrous or with different distribution of pubescence 41

41(40) Anther cells arranged in 2 vertical rows (Fig. 2c and d); stamens and inner face of tepals glabrous or variously pubescent, rarely papillose (if papillose, the anther cells clearly in 2 vertical rows); tepals free at base, falling individually in old flowers; a few old stamens sometimes present on cupule of young fruits; tepals at anthesis erect (Fig. 1b) or spreading .... *Ocotea*

41 Anther cells arranged in an arc (Fig. 2a and b); stamens and inner face of tepals papillose; tepals united at the base, usually falling as a unit (together with stamens) in old flowers; stamens rarely present on cupule of young fruits; tepals at anthesis spreading (Fig. 1a) .... *Nectandra*

42(3) Plants cold-season deciduous and/or inflorescences subumbellate and young flowers enclosed in involucrate bracts 43

42 Plants evergreen and inflorescences paniculate, the flowers not enclosed in involucrate bracts 45

43(42) Inflorescences racemose or paniculate; leaves often trilobed .... *Sassafras*
43 Inflorescences subumbellate; leaves never trilobed 44
44(43) Plants deciduous; pseudo-umbels sessile or nearly so .... *Lindera*
44 Plants deciduous or evergreen; pseudo-umbels pedunculate .... *Litsea*
45(42) Staminodes straplike, the filaments about as wide as the anther; traces of locelli four on each anther .... *Rhodostemonodaphne*
45 Staminodes club-shaped, the filaments narrower than the anthers 46
46(45) Anthers with 4 remnants of locelli; leaves alternate .... *Ocotea*
46 Anthers with 2 remnants of locelli; leaves alternate or whorled .... *Endlicheria*

Clave Para los Géneros de Lauraceae del Nuevo Mundo

1 Trepadoras parásitas y áfilas .... *Cassytha*
1 Arbustos o árboles con hojas verdes 2
2(1) Estambre aparentemente 1 por fusión completa de 3 estambres .... "*Gamanthera*"
2 Estambres claramente más de 1 3
3(2) Flores bisexuales o estaminadas 4
3 Flores pistiladas 42
4(3) Estambres 3 5
4 Estambres más de 3 8
5(4) Anteras con 4 tecas .... *Williamodendron*
5 Anteras con 2 tecas 6
6(5) Hojas agrupadas en los extremos de las ramas; tecas extrorsas; inflorescencia una panícula con las divisiones últimas racemosas .... *Mezilaurus*
6 Hojas alternas u opuestas, no agrupadas; orientación de las tecas variable (en *L. cannella* hojas algo agrupadas, pero entonces las tecas introrsas); inflorescencia paniculiforme, divisiones últimas cimosas 7
7(6) Solamente los estambres del Verticilo I fértiles, tecas laterales y grandes o lateral-basales y pequeñas; inflorescencias y flores glabras .... *Aiouea*
7 Solamente los estambres del Verticilo III fértiles, tecas extrorsas, introrsas o ±apicales, nunca laterales; inflorescencias y/o flores usualmente pubescentes .... *Licaria*
8(4) Anteras de los 6 estambres exteriores con 2 tecas 9
8 Anteras de los 6 estambres exteriores con 4 tecas 23
9(8) Flores unisexuales 10
9 Flores bisexuales 11
10(9) Hojas deciduas en el invierno, flores producidas antes que las hojas .... *Lindera*
10 Hojas no deciduas, flores y hojas presentes a la vez .... *Endlicheria*
11(9) Hojas opuestas 12
11 Hojas alternas o agrupadas 15
12(11) Estambres 6, rojo-obscuros, con filamentos más anchos que las anteras y unidos en la base; tépalos exteriores cerca de ½ del largo de los interiores .... *Anaueria*
12 Estambres 6 o 9, nunca rojo-obscuros, con filamentos más delgados que las anteras y libres; tépalos iguales o muy desiguales con los exteriores ¼ o menos del largo de los interiores 13
13(12) Tépalos exteriores ¼ o menos del largo de los interiores .... *Caryodaphnopsis*
13 Tépalos iguales 14
14(13) Tubo floral profundo, tan largo como los tépalos .... *Cryptocarya*
14 Tubo floral poco profundo, mucho más corto que los tépalos .... *Beilschmiedia*
15(11) Estambres del Verticilo III con filamentos unidos; flores rojas .... *Kubitzkia*
15 Estambres con filamentos libres; flores raramente rojas 16
16(15) Estambres del Verticilo I estériles, tepaloides; estambres fértiles 6, representando los Verticilos II y III .... *Phyllostemonodaphne*
16 Estambres del Verticilo I fértiles; estambres fértiles 9 ó 6, si 6 entonces representando los Verticilos I y II 17
17(16) Estambres fértiles 9, cada uno con 2 glándulas en la base .... *Urbanodendron*
17 Estambres fértiles 6 ó 9, solo los del Verticilo III con glándulas en la base 18
18(17) Tépalos exteriores cerca de ½ del largo de los interiores (Fig. 1c) 19
18 Tépalos iguales o casi iguales (Fig. 1a y b) 20
19(18) Estaminodios bien desarrollados, con ápices sagitados o cordados; tubo floral muy corto, mucho más corto que los tépalos; especies andinas de 1,000–2,500 msnm .... *Persea*
19 Estaminodios ausentes; tubo floral bien desarrollados; especies amazonicas de elevaciones bajas .... *Aniba canelilla* o *A. parviflora*
20(18) Tubo floral poco profundo, escasamente visible en la ántesis .... *Beilschmiedia*
20 Tubo floral bien desarrollado, más o menos del mismo largo que los tépalos 21
21(20) Hojas con una reticulación fina y prominente; tubo floral profundo y angosto, tépalos ± patentes y el limbo claramente más ancho que el tubo; filamentos mucho más angostos que las anteras; estaminodios bien desarrollados .... *Cryptocarya*
21 Hojas con una reticulación laxa o inconspicua; tubo floral poco profundo o profundo, si profundo entonces los tépalos erectos y el limbo tan ancho como el tubo; filamentos frecuentemente poco diferenciados de las anteras; estaminodios presentes o ausentes 22
22(21) Flores menudamente tomentosas o aplicado-pubescentes, nunca pruinosas; filamentos con frecuencia densamente pubescentes, poco diferenciados de las anteras; hojas alternas o agrupadas .... *Aniba*
22 Flores usualmente glabras, infrecuentemente con tricomas dispersas, a veces pruinosas; filamentos usualmente glabros y diferenciados de las anteras; hojas alternas .... *Aiouea*
23(8) Flores unisexuales 24
23 Flores bisexuales 27

24(23) Inflorescencias jóvenes envueltas en brácteas decusadas; flores en pseudo-umbelas ... *Litsea*
24 Inflorescencias jóvenes no envueltas en brácteas decusadas; flores en panículas o racimos ... 25
25(24) Arboles deciduos, flores producidas antes o junto con las hojas; hojas frecuentemente lobadas ... *Sassafras*
25 Arboles o arbustos perennifolios, flores producidas con las hojas maduras; hojas nunca lobadas ... 26
26(25) Tecas dispuestas en un arco bajo; anteras poco diferenciadas de los filamentos (Fig. 2e) ... *Rhodostemonodaphne*
26 Tecas dispuestas en 2 hileras; anteras claramente más anchas que los filamentos (raramente filamentos muy cortos) (Fig. 2c y d) ... *Ocotea*
27(23) Flores en pseudo-umbelas, éstas cubiertas por brácteas cuando jóvenes ... *Umbellularia*
27 Flores en inflorescencias paniculiformes, éstas nunca envueltas por brácteas ... 28
28(27) Hojas opuestas ... 29
28 Hojas alternas o verticiladas ... 31
29(28) Tépalos exteriores ¼ del tamaño de los interiores o más pequeños; hojas con frecuencia fuertemente trinervias ... *Caryodaphnopsis*
29 Tépalos iguales; hojas pinnatinervias ... 30
30(29) Estambres 12 o más; hojas glabras o casi glabras en el envés ... "*Chlorocardium*"
30 Estambres 9; hojas ferrugíneo-tomentosas en el envés ... *Nectandra oppositifolia*
31(28) Tecas en el ápice plano de los estambres columnares ... *Povedadaphne*
31 Tecas no apicales, estambres no columnares ... 32
32(31) Todo los estambres con 2 glándulas en la base, las glándulas libres ... *Urbanodendron*
32 Solamente los estambres del Verticilo III con glándulas (en *Pleurothyrium* las glándulas muy agrandadas y a veces fusionadas) ... 33
33(32) Estambres del Verticilo III con filamentos fusionados; flores rojas ... *Kubitzkia*
33 Estambres del Verticilo III con filamentos libres, o si aparentemente fusionados (en algunas especies de *Ocotea*), entonces las flores blancas a amarillas, nunca rojas ... 34
34(33) Estambres del Verticilo I estériles y tepaloides ... *Dicypellium*
34 Estambres del Verticilo I fértiles y no tepaloides ... 35
35(34) Tépalos exteriores cerca de ½ del tamaño de los interiores ... 36
35 Tépalos iguales o casi iguales ... 37
36(35) Estambres de los Verticilos I y II con ápices triangulares y estériles; hojas con ápices redondeados u obtusos; Guayanas y áreas adyacentes de Brasil y Venezuela ... *Ocotea rubra*
36 Estambres de Verticilos I y II sin ápices triangulares y estériles, las tecas ocupando toda la antera; hojas raramente con ápices redondeados u obtusos; ampliamente distribuida desde el sur de los Estados Unidos hasta Brasil y Chile ... *Persea*
37(35) Glándulas estaminales muy agrandadas, empujando entre los 6 estambres exteriores y a veces fusionadas en una masa grande como almohada; estambres de los Verticilos I y II con al menos 2 de las tecas laterales ... *Pleurothyrium*
37 Glándulas estaminales no agrandadas ni fusionadas; estambres exteriores con todas las tecas introrsas ... 38
38(37) Estaminodios representando el Verticilo IV bien desarrollados, con ápices cordados o sagitados; filamentos iguales o más largos que las anteras ... 39
38 Estaminodios representando Verticilo IV ausentes o si presentes pequeños y mayormente sin ápices cordados o sagitados; filamentos iguales o más cortos que las anteras (unas pocas especies de *Ocotea* tienen estaminodios grandes con ápices cordados, pero estas tienen filamentos muy cortos) ... 40
39(38) Hojas usualmente trinervias, alternas, frecuentemente con fascículos de tricomas presentes en las axilas de los nervios basales ... *Cinnamomum*
39 Hojas pinnatinervias, alternas o agrupadas, sin fascículos de tricomas axilares ... *Persea*
40(38) Hojas agrupadas; ramitas con fascículos de cicatrices de brácteas caídas; tépalos algo redondos, hialinos, pubescentes solamente en la base ... "*Paraia*"
40 Hojas alternas; ramitas sin fascículos de cicatrices; tépalos ni redondos ni hialinos, glabros o con la pubescencia distribuida de otra forma ... 41
41(40) Tecas dispuestas en 2 hileras (Fig. 2c y d); estambres y caras adaxiales de los tépalos glabros o variadamente pubescentes, raramente papilosos (si papilosos, las tecas claramente en 2 hileras); tépalos libres en la base y cayéndose individualmente; unos pocos estambres viejos frecuentemente presentes en la cúpula de los frutos jóvenes; tépalos erectos o patentes en la ántesis (Fig. 2b) ... *Ocotea*
41 Tecas dispuestas en un arco (Fig. 2a y b); estambres y caras adaxiales de los tépalos papilosas; tépalos unidos apenas en la base, usualmente cayéndose juntos (y juntos con los estambres); estambres raramente presentes en la cúpula de los frutos jóvenes; tépalos patentes en la ántesis (Fig. 1a) ... *Nectandra*
42(3) Plantas deciduas en el invierno y/o inflorescencias subumbeladas y flores jóvenes envueltas por brácteas involucrales ... 43
42 Plantas perennifolias con inflorescencias paniculadas, flores no envueltas por brácteas involucrales ... 45
43(42) Inflorescencias racemosas o paniculadas; hojas frecuentemente trilobadas ... *Sassafras*
43 Inflorescencias subumbeladas; hojas nunca trilobadas ... 44
44(43) Plantas deciduas; pseudo-umbelas sésiles o casi sésiles ... *Lindera*
44 Plantas deciduas o perennifolias; pseudo-umbelas pedunculadas ... *Litsea*
45(42) Estaminodios ligulados, filamentos igual de

ancho que las anteras, cada antera con vestigios de 4 tecas .... *Rhodostemonodaphne*
45 Estaminodios claviformes, filamentos más delgados que las anteras 46
46(45) Anteras de los estaminodios con vestigios de 4 tecas; hojas alternas .... *Ocotea*
46 Anteras de los estaminodios con vestigios de 2 tecas; hojas alternas o verticiladas .... *Endlicheria*

Aiouea Aublet

Probably a polyphyletic genus in the currently accepted sense, as has been noted by several authors (Burger, 1988; Rohwer et al., in press; van der Werff, 1987b, 1988). The genus has been monographed by Renner (1982) and consists of about 20 species, ranging from southern Mexico to southern Brazil and Paraguay. Most species have the fruit seated on a shallow cupule with a thickened pedicel.

Anaueria Kostermans

A monotypic genus known from Amazonian forests near the border of Brazil and Peru. The seeds are said to be edible after roasting. A cupule is lacking in fruit. Flowers have green tepals and dark red stamens, very unusual in Lauraceae.

Aniba Aublet

Recently revised by Kubitzki (1982). *Aniba* includes 40–50 species, many with pleasantly aromatic yellow wood (rosewood oil is distilled from *Aniba rosaeodora*). It is distributed from Costa Rica to southern Brazil and Bolivia. Most species occur in the lowlands, but it has also been collected in the Andes up to 1,800 m. The fruit is seated in a rather deep cupule, which is often lenticellate or warty. Several species have clustered leaves.

Beilschmiedia Nees

In the Neotropics a poorly understood genus with 10–20 species, last revised by Kostermans (1938), who accepted 15 species. It has been collected from Mexico to southern Brazil and in the West Indies. The fruit lacks a cupule. In the Palaeotropics, *Beilschmiedia* is equally poorly understood, but is represented by many more species.

Caryodaphnopsis Airy Shaw

Only recently reported from the Neotropics (van der Werff & Richter, 1985), this genus includes five published neotropical species, with several more awaiting publication. The strongly unequal tepals and opposite leaves are diagnostic. Fruits (in neotropical species) are round or pearshaped, and seated on a naked pedicel. It occurs in lowland forests from Costa Rica to Peru and Brazil. The seven palaeotropical species occur in Indochina, with one species extending to New Guinea (Kostermans, 1974).

Cassytha L.

One species in the Neotropics, from Mexico to Brazil, often found near the coast, but also locally common in *Mauritia* swamps. More species occur in Australia and South Africa. The genus has been placed in its own family because of its parasitic habit, but is here retained in the Lauraceae.

"*Chlorocardium*"

A genus with two species, one from Guyana and Surinam, the other from Amazonian Ecuador and adjacent Colombia, previously included in *Ocotea*, but differing in characters of flowers, wood, and leaf position. The Ecuadorian/Colombian species is incompletely known. Fruits are described as large (to 7 × 5 cm), with a normal or very large cupule.

Cinnamomum Schaeffer

A large, poorly understood genus occurring in Asia, Australia, and the Americas. Possibly with more than 50 species in the Neotropics, known from Mexico and the West Indies to southern Brazil and Paraguay. The fruit is subtended by a small cupule, this often crowned with persistent tepals. The neotropical species have often been treated in *Phoebe*, but seem better placed in *Cinnamomum*. Many Asian species, including *C. verum*, which yields cinnamon, have opposite leaves, but all neotropical species have alternate, mostly tripliveined leaves. *Cinnamomum*, as accepted here, is possibly polyphyletic.

Cryptocarya R. Brown

A large, poorly understood pantropical genus, with ten or fewer neotropical species, mostly in southern Brazil and Chile, but also known from French Guyana and adjacent Brazil, Andean Venezuela, Ecuador, and Peru. The fruit is almost completely enclosed in the cupule, which has only a small, apical pore.

Dicypellium Nees & Martius

A small genus of two rarely collected species, restricted to Amazonian Brazil, reviewed by Rohwer (1988). The cupule is cupshaped, and has a double margin. The tepals are persistent in fruit. One species, *Dicypellium caryophyllaceum*, has been heavily exploited because of its aromatic bark.

Endlicheria Nees

A neotropical genus of about 40 species, reported from Costa Rica, the Lesser Antilles south to Paraguay, and southern Brazil. The genus is polyphyletic (Rohwer et al., in press). The cupule is variable; most species have a thick, fleshy and smooth cupule. Several species have whorled leaves.

"*Gamanthera*"

A monotypic genus recently discovered in Costa Rica, characterized by the presence of only one "stamen," actually a synandrium formed by complete fusion of three stamens (Endress, pers. comm.). The number of locelli of the synandrium can be 3, 2, or 1. The cupule is rather deeply cupshaped, with a double margin and persistent, reflexed tepals. The only species is monoecious.

Kubitzkia van der Werff

A neotropical genus of one, possibly two, species, known from Guyana, Surinam, Venezuela, and Brazil, reviewed by Rohwer (1988), who accepts *Systemonodaphne* as the valid name for this genus. The cupule is cupshaped, with a double margin and persistent, reflexed tepals. Arguments for rejecting the name *Systemonodaphne* are discussed by van der Werff (1986).

Licaria Aublet

A neotropical genus of about 40 species, revised by Kurz (1983). It occurs from southern Florida and Mexico to southern Brazil and Bolivia. The cupule is cupshaped and has a double margin; however, in some species the double margin is scarcely noticeable. A few species have opposite leaves.

Lindera Thunberg

Lindera is represented by three species in eastern North America and an additional hundred in Asia. The fruit is seated on a small, platelike cupule. Two of the American species are rare; one was only recently described (Wofford, 1983). Twigs, leaves, and fruits of the common American species are used to prepare a fragrant tea.

Litsea Lamarck

In the New World *Litsea* is represented by about five species, known from the U.S.A., the mountains of Mexico, and Costa Rica. Most species (several hundred) occur in Asia south to Australia and the Pacific Islands. The fruit is subtended by a cupshaped cupule. Leaves of *Litsea glaucescens* are used as a spice, similar to bay leaves.

Mezilaurus Taubert

A neotropical genus of 16 species occurring in the Amazon basin (including Bolivia, Peru, Colombia, Venezuela, and the three Guyanas), revised by van der Werff (1987a). The fruit is seated on a small, platelike cupule. The flowers are very similar to those of *Licaria*, but the two genera differ in cupule shape, leaf position, inflorescence type and wood anatomy. All species have leaves clustered at tips of branches. Two species with 4-celled anthers were recently transferred to *Williamodendron* (Kubitzki & Richter, 1987).

Nectandra Rol. ex Rottb.

A large, neotropical genus of about 120 species, currently under revision by J. Rohwer. It occurs from southern Florida and Mexico to Argentina. Fruits are seated in a cupshaped (sometimes small) cupule. Tepals are spreading at anthesis.

Ocotea Aublet

The largest genus of Lauraceae in the Neotropics, with at least 300 species. It is also known from Madagascar and tropical Africa. The genus is very variable and serves as a dumping ground for species that cannot be readily accommodated in other genera. Its distribution in the Neotropics is from Mexico and southern Florida to Argentina. Shape and size of cupule is variable and ranges from small and platelike to cupshaped, sometimes with a double margin or with persistent tepals. Tepals are erect or spreading at anthesis.

"*Paraia*"

A monotypic genus known from Amazonian Brazil. The cupule has a double margin with persistent tepals. Tepals are erect at anthesis.

Persea Miller

An incompletely understood genus with at least 80 neotropical species, but better represented in Asia and with one species in the Canary Islands. The fruit can be seated on a naked pedicel (as in *Persea americana*, the type species) or is subtended by persistent, indurate tepals (as in the great majority of species). A cupule is never present. A worldwide survey is needed to determine if *Machilus* belongs in *Persea* (as is accepted here) or should be recognized as a distinct genus. The neotropical species have been revised by Kopp (1966). *Persea* *americana* is widely cultivated for its edible fruit. A few neotropical species have clustered leaves.

Phoebe Nees

Phoebe is here considered a palaeotropical genus. Neotropical species formerly placed in *Phoebe* are, for the larger part, included in *Cinnamomum*; a few belong to *Ocotea*.

Phyllostemonodaphne Kostermans

An infrequently collected, monotypic genus from the Atlantic rainforests in southern Brazil. The fruit is seated in a double-rimmed cupule. The genus was revised by Rohwer (1988).

Pleurothyrium Nees

A neotropical genus with close to 40 species, known from Guatemala south to Peru, Bolivia, and Brazil. The fruit is seated in a rather deep, cup-shaped cupule, which is often warty or lenticellate. Several species have a pronounced marginal vein, an unusual feature in Lauraceae, or clustered leaves. The genus is being revised by van der Werff.

Povedadaphne Burger

A monotypic genus apparently restricted to Costa Rica. The rather large fruit is subtended by a small, platelike cupule. The fruiting pedicel is swollen. Distinctive are the nine columnar stamens, each with four apical locelli.

Rhodostemonodaphne Rohwer & Kubitzki

A poorly known genus of about a dozen species, two of which are rather common, while several species are in need of description. The genus has been reported from Costa Rica to Brazil and Peru. The cupule is deeply cupshaped and rather large.

Sassafras Presl

A small genus with three species, one widespread in the eastern U.S.A., the other two in China. Leaves are frequently lobed. The cupule is cup-shaped, often crowned with remnants of the tepals. Bark and root have been used to prepare tea or root beer.

Systemonodaphne

See *Kubitzkia*.

Umbellularia Nuttall

A monotypic genus occurring in California and southern Oregon (U.S.A.). The fruit is subtended by a small, platelike cupule. The leaves are used as a spice; the wood is valued for cabinetmaking.

Urbanodendron Mez

A neotropical genus of three species, restricted to southern Brazil. The cupules are known in two species: double-rimmed, with more or less persistent tepals. The genus has been revised by Rohwer (1988).

Williamodendron Kubitzki & Richter

A neotropical genus with two species, infrequently collected, but known from Costa Rica, northern Colombia, Amazonia, and southern Brazil. The number of species will likely increase as more collections become available. The cupule is small and platelike, resembling that of *Mezilaurus*. Leaves are clustered at the tips of branches.

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